



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/681,515	10/08/2003	James P. DeYoung	5697-62	9658
20792	7590	11/22/2004		
MYERS BIGEL SIBLEY & SAJOVEC PO BOX 37428 RALEIGH, NC 27627			EXAMINER JOLLEY, KIRSTEN	
			ART UNIT	PAPER NUMBER
			1762	

DATE MAILED: 11/22/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/681,515	DEYOUNG ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Kirsten C Jolley	1762	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 13 September 2004.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-32 is/are pending in the application.
- 4a) Of the above claim(s) 8-32 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                                   | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)               | Paper No(s)/Mail Date. _____  |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>1/26/04, 10/8/04</u>  | 6) <input type="checkbox"/> Other: _____                                    |

## **DETAILED ACTION**

### ***Election/Restrictions***

1. Applicant's election with traverse of Group I, claims 1-7, in the reply filed on September 13, 2004 is acknowledged. The traversal is on the ground(s) that a search of the claims of Group I would encompass the claims of Groups II and III such that no undue burden would be presented to the USPTO to search all claims in a single application. This is not found persuasive because the Examiner disagrees that a search of Group I would encompass the claims of Groups II and III. Group II is directed to a method of depositing a film of material by coating a substrate with a reactive component from a supercritical or near-supercritical fluid, and then conversion to a stable film; Group I claims do not require contacting a conversion reagent to a thin film containing a precursor under conditions that initiate a chemical reaction and form a film of a chemically converted material, therefore Group I claims do not encompass Group II claims. Group III is directed to methods of contacting a liquid solution comprising CO<sub>2</sub> and a precursor material to a substrate, and then conversion to a stable film; Group I claims do not require use of a liquid solution comprising CO<sub>2</sub> or reacting the precursor material under conditions that initiate a chemical reaction and form a film of a chemically converted material, therefore Group I claims do not encompass Group III claims.

The requirement is still deemed proper and is therefore made FINAL.

2. It is agreed that the requirement for an election of species set forth in paragraphs 5 and 6 of the Official action is moot in light of the response to the restriction requirement.

***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claim 7 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 7 is vague and indefinite because a supercritical fluid is not a “separate compressed gas atmosphere.” A supercritical fluid is not a “gas,” but has properties of both a liquid and gas.

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Carbonell et al. (US 6,083,565).

Carbonell et al. discloses a method of coating a substrate (including electronic components such as circuit boards or semiconductor articles) comprising the steps of: providing the substrate in an enclosed vessel; at least partially filling the enclosed vessel with a solution comprising a first supercritical fluid and a coating component so that the fluid contacts the surface of the substrate; and then withdrawing the substrate into a separate compressed gas

Art Unit: 1762

atmosphere, the second compressed gas atmosphere having a density less than the first supercritical fluid, such that the boundary moves across the substrate surface and a thin film of coating component is deposited on said substrate (col. 1, lines 39-51; col. 6, lines 16-32).

Carbonell et al. teaches a step of withdrawing the substrate from the first supercritical fluid into the second compressed gas atmosphere, instead of displacing the first supercritical fluid with the compressed gas atmosphere. It is the Examiner's position that the displacement of one surrounding fluid with one another versus moving the substrate itself from one surrounding fluid to another is not a patentable variation. It would have been obvious for one having ordinary skill in the art to have displaced the fluid atmosphere of the first supercritical fluid with the compressed gas atmosphere in place of withdrawing the substrate from the supercritical fluid to the compressed gas atmosphere in the process of Carbonell et al. with the expectation of similar and successful results, in the absence of a showing of criticality, because both displacing atmospheres and moving the substrates are equivalent relative movements with respect to the substrate surface and would yield the same results.

With respect to claim 3, it is noted that the closed vessel in the method of Carbonell et al. is partially filled with both the supercritical fluid and compressed gas throughout the process.

As to claims 4 and 6, Carbonell et al. discloses a pressure in the vessel in the range of 10-10,000 psi (col. 6, lines 21-32). Overlapping ranges are *prima facie* evidence of obviousness. It would have been obvious to one having ordinary skill in the art to have selected the portion of Carbonell et al.'s pressure range that corresponds to the claimed range. *In re Malagari*, 184 USPQ 549 (CCPA 1974). As to the temperature, Carbonell et al. is silent with regard to the temperature of the fluids. It would have been obvious for one having ordinary skill in the art to

Art Unit: 1762

have determined the optimum temperature such that the first fluid is in a supercritical phase and the second phase remains a compressed gas through routine experimentation in the absence of a showing of criticality. It is well settled that determination of optimum values of cause effective variables such as these process parameters is within the skill of one practicing in the art. *In re Boesch*, 205 USPQ 215 (CCPA 1980).

As to claim 5, Carbonell et al. teaches that the first supercritical fluid and separate compressed gas atmosphere may both be carbon dioxide (col. 6, lines 21-32). Carbonell et al. discloses overlapping coating thicknesses in col. 3, lines 21-35. It would have been obvious to one having ordinary skill in the art to have selected the portion of Carbonell et al.'s coating thickness range that corresponds to the claimed range. *In re Malagari*, 184 USPQ 549 (CCPA 1974).

#### ***Allowable Subject Matter***


7. Claim 7 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims, and if written to overcome the 35 USC 112, 2<sup>nd</sup> paragraph rejection. The prior art does not teach or fairly suggest a method of providing a microelectronic substrate in an enclosed vessel and at least partially filling the vessel with a first supercritical fluid carrying a coating component, adding a separate supercritical fluid having a density less than the first supercritical fluid to the vessel, and then displacing said first supercritical fluid from the vessel by continuing adding said second supercritical fluid so that the boundary moves across said surface portion and a thin film of coating component is deposited on the substrate.

***Conclusion***

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kirsten C Jolley whose telephone number is 571-272-1421. The examiner can normally be reached on Monday to Thursday and every other Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shrive P Beck can be reached on 571-272-1415. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Kirsten C Jolley  
Primary Examiner  
Art Unit 1762

kcj